

WHAT IS CLAIMED IS:

1. A fixing apparatus comprising:
 - a fixing roller;
 - 5 heating means for allowing the outer peripheral surface of said fixing roller to have a given temperature capable of performing a fixing operation;
 - a pressing roller in rotational contact with said fixing roller; and
 - a biasing member for allowing said pressing roller to be brought into press contact with said fixing roller at a given pressure, wherein
 - 10 said fixing apparatus is operable to allow a sheet with a surface supporting an unfixed toner thereon to pass through said rotational contact region along one direction so as to fix said unfixed toner onto said sheet, said fixing apparatus being characterized in that:
 - said fixing roller is disposed on the side of said sheet surface supporting said unfixed toner;
 - said pressing roller is disposed on the opposite side of said fixing roller with respect to said
 - 15 sheet; and
 - said biasing member is adapted to apply a biasing force to said pressing roller in a direction intersecting with an axis connecting the respective center positions of said fixing roller and said pressing roller.
- 20 2. The fixing apparatus as defined in claim 1, which satisfies the following formula:
$$+ 5^{\circ} < \theta < + 80^{\circ},$$
 - wherein θ is an angle defined between X and Y, said X being an axis connecting the respective centers of said fixing and pressing rollers, said Y being an axis along a direction in which said pressing roller is biased toward said fixing roller in said rotational contact region, and
 - 25 a positive sign assigned to said angle θ means that said angle θ is defined between said axis X and said axis Y located on a sheet-feeding side with respect to said axis X.
3. The fixing apparatus as defined in claim 1, which satisfies the following formula:
$$- 5^{\circ} < \theta < - 80^{\circ},$$

wherein θ is an angle defined between X and Y, said X being an axis connecting the respective centers of said fixing and pressing rollers, said Y being an axis along a direction in which said pressing roller is biased toward said fixing roller in said rotational contact region, and

a negative sign assigned to said angle θ means that said angle θ is defined between said axis

5 X and said axis Y located on a sheet-discharging side with respect to said axis X.

4. The fixing apparatus as defined in claim 1, wherein
said fixing roller has a hard surface portion, and
said pressing roller has an elastic surface portion.

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5. The fixing apparatus as defined in claim 4, which further includes:
releasing means for releasing the sheet attached on the outer peripheral surface of said
fixing roller after passing through said rotational contact region, from the outer peripheral
surface of said fixing roller.

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6. The fixing apparatus as defined in claim 5, wherein
said releasing means is disposed in contact with the outer peripheral surface of said fixing
roller.

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7. The fixing apparatus as defined in claim 5, wherein
said releasing means is disposed opposed to the outer peripheral surface of said fixing roller
in a non-contact manner.

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8. The fixing apparatus as defined in claim 4, wherein
said pressing roller includes a core,
said elastic surface portion is made of silicone rubber and formed on the outer periphery of
said core, and
the thickness of said elastic surface portion is arranged to provide said rotational contact
region.

9. The fixing apparatus as defined in claim 4, wherein
said heating means includes a heater embedded in said fixing roller, and
said heater is operable to heat the outer peripheral surface of said fixing roller from the
5 inside of said fixing roller.
10. The fixing apparatus as defined in claim 1, wherein
each of said fixing and pressing rollers has an elastic surface portion.
- 10 11. The fixing apparatus as defined in claim 10, wherein
respective said elastic surface portions of said fixing and pressing rollers have the same
elasticity to allow said rotational contact region to be formed as a 2-dimensional configuration.
12. The fixing apparatus as defined in claim 10, wherein
15 said elastic surface portion of said fixing roller has a higher elasticity than that of said
elastic surface portion of said pressing roller.
13. The fixing apparatus as defined in claim 10, wherein
each of said fixing and pressing rollers includes a core,
20 each of said elastic surface portions of said fixing and pressing roller is made of silicone
rubber and formed on the outer periphery of corresponding said core, and
the total thickness of said elastic surface portions is arranged to provide said rotational
contact region.
- 25 14. The fixing apparatus as defined in claim 13, wherein
said heating means includes a heater embedded in said fixing roller, and
said heater is operable to heat the outer peripheral surface of said fixing roller from the
inside of said fixing roller.

15. The fixing apparatus as defined in claim 14, wherein
said heating means further includes an auxiliary heater embedded in said pressing roller,
and

5 said auxiliary heater is operable to heat the sheet which is passing through said rotational
contact region, from the sheet surface having no unfixed toner.

16. The fixing apparatus as defined in claim 1, wherein
said fixing roller has an elastic surface portion, and said pressing roller has a hard surface
portion.

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17. The fixing apparatus as defined in claim 16, wherein
said fixing roller includes a core,
said elastic surface portion is made of silicone rubber and formed on the outer periphery of
said core, and

15 the thickness of said elastic surface portion is arranged to provide said rotational contact
region.

18. The fixing apparatus as defined in claim 16, wherein
said heating means includes at least one heating roller in rotational contact with the outer
20 peripheral surface of said fixing roller, and

said heating roller is operable to heat the outer peripheral surface of said fixing roller from
the outside of the fixing roller.

19. The fixing apparatus as defined in claim 18, wherein
25 said heating roller includes a metal sleeve, and a heater housed in said sleeve.

20. The fixing apparatus as defined in claim 18, wherein
said heating means further includes an auxiliary heater embedded in said pressing roller,
and

said auxiliary heater is operable to heat the sheet which is passing through said rotational contact region, from the sheet surface having no unfixed toner.

21. The fixing apparatus as defined in claim 1, wherein

5 said fixing roller includes a core, an elastic layer formed on the outer periphery of said core, and a thin metal sleeve formed on the outer periphery of said elastic layer.

22. The fixing apparatus as defined in claim 21, wherein

10 said heating means includes an induction-heating device disposed opposed to the outer peripheral surface of said fixing roller in a non-contact manner, and
 said induction-heating device is operable to induction-heat said thin metal sleeve.

23. The fixing apparatus as defined in claim 22, wherein

15 said metal sleeve is made of electroformed nickel material.

24. The fixing apparatus as defined in claim 1, wherein

20 said fixing roller includes a core, an elastic layer disposed on the outer periphery of said core, and a thin sleeve disposed on the outer periphery of said elastic layer and made of synthetic resin material which dispersedly contains a material for generating heat therein through electromagnetic induction,

 said heating means includes an induction-heating device disposed opposed to the outer peripheral surface of said fixing roller in a non-contact manner, and

 said induction-heating device is operable to induction-heat said thin sleeve.

25 25. The fixing apparatus as defined in claim 24, wherein said synthetic resin material is polyimide resin.